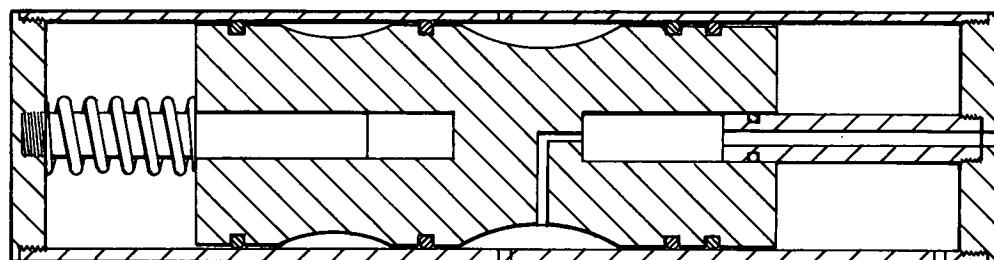
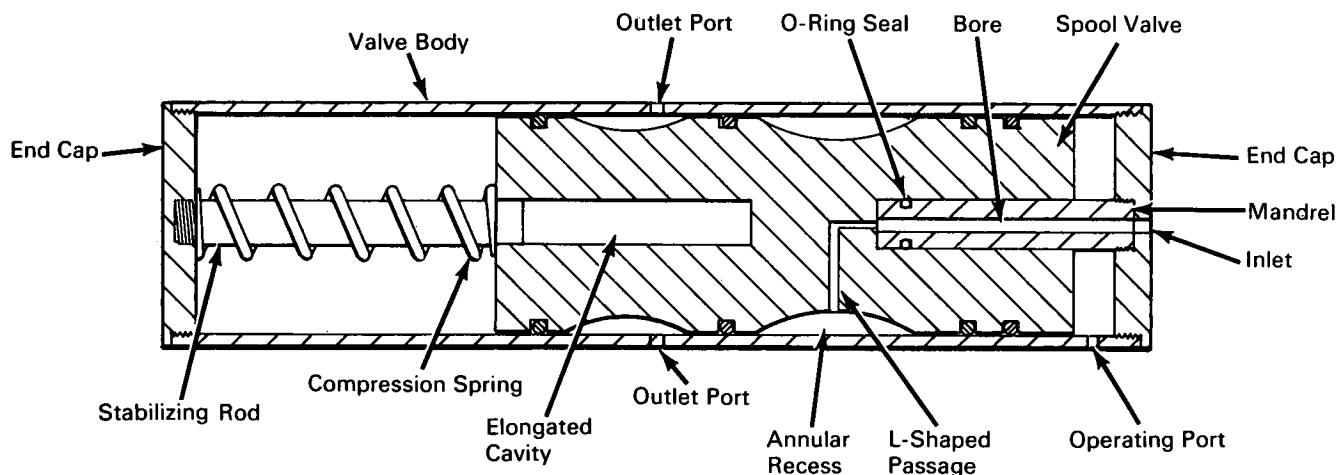


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Remotely Operated High Pressure Valve Protects Test Personnel



The problem:

In testing certain spacecraft systems, pressures of more than 20,000 psi may be used. Where pressures of this magnitude are involved, there is always a possibility that some component in the high pressure system may rupture, exposing anyone in the area to possible severe injury. It is desirable to isolate test personnel from the high pressure system. Previous methods for manually controlling and adjusting high

pressure valves were inconvenient, difficult, and uncertain. Electrically operated valves were undesirable because of the ever-present danger of sparks.

The solution:

A valve designed for use in high pressure systems that can easily be opened and closed by an operator stationed at a position remote from the high pressure system, assuring the operator's safety in the event

(continued overleaf)

that the valve or other component within the high pressure system fails.

How it's done:

Fluid under high pressure is admitted to the valve through the inlet, but is blocked by the position of the spool valve which is biased to a closed position by the force of the spring. Since the force of the spring is greater than the incoming pressure the spool valve will not move.

To open the valve, a low pressure fluid is admitted through the operating port to act on the side of the spool valve opposite the side being acted upon by the spring. This low pressure supplements the force of the high pressure fluid to develop a force greater than that of the spring. This causes the spool valve to move within the body to align the passageway within the valve with outlet ports in the body.

To close the valve, the low pressure is decreased in the body so that the pressure of the spring once again becomes greater than the incoming pressure, and the spool valve is moved back to its original position to close off the high pressure fluid.

Notes:

1. Test personnel operating this valve are exposed only to the low pressure source necessary for opening and closing the high pressure valve, and because of their remote location are at no time exposed to the extreme high pressure being controlled by the valve.

2. This valve also serves as a self-regulating valve in that if the incoming pressure drops below a desired value the valve will automatically close, warning the operator that the testing pressure has dropped to an undesired level.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B67-10291

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D. C. 20546.

Source: Benjamin T. Howland
of North American Aviation, Inc.
under contract to
Manned Spacecraft Center
(MSC-11010)